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EXAMINER

HEVEY, JOHN A

ART UNIT

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1793

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/589,209	<b>Applicant(s)</b> LARCHER ET AL.	
	<b>Examiner</b> JOHN A. HEVEY	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 8/11/2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 20-38 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 20-38 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Status of Application***

Claims 1-19 are cancelled. Claims 20-38 are pending and presented for examination.

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 20-32 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Aozasa (US6171572).

Claim 20 is drawn to a composition comprising zirconium oxide at least one additive selected from praseodymium oxide, lanthanum oxide, and neodymium oxide and having a specific surface area of at least 29 m<sup>2</sup>/g after calcination for 10 hours at 1000 C.

Claims 20-27 define the product by how the product was made. Thus, claims 20-27 are product-by-process claims. For purposes of examination, product-by-process claims are not limited to the manipulation of the recited steps, only the structure implied by the steps. See MPEP 2113. In the present case, the recited steps imply a structure of a mixed oxide having a specific surface area of at least 29 m<sup>2</sup>/g. The reference suggests such a product.

In regards to claims 20-27, Aozasa teaches a zirconium – cerium composite oxide and a co-catalyst for purifying exhaust gas comprising Zr/Ce weight ratio of 51-95:49-5 and optionally further comprising one or more additives selected from yttrium, scandium, lanthanum, praseodymium, neodymium, samarium, europium, gadolinium, magnesium, calcium, barium, aluminum, titanium, and hafnium in the amount of 0.1-20% by weight, and where said composite oxide has a specific surface area of not smaller than  $50 \text{ m}^2/\text{g}$  and is capable of maintaining a specific surface area of at least  $20 \text{ m}^2/\text{g}$  after calcination at  $1100 \text{ C}$  for 6 hours (see col 3, ln 23-38).

The reference further teaches specific embodiments, comprising zirconium, cerium and lanthanum oxide, which have a specific surface area of over  $70 \text{ m}^2/\text{g}$  after  $900 \text{ C}$  calcination for 6 hours, over  $50 \text{ m}^2/\text{g}$  after  $1000 \text{ C}$  calcination for 6 hours, and over  $20 \text{ m}^2/\text{g}$  after  $1100 \text{ C}$  for 6 hours (see examples 1-8, Table 1). Although Aozasa does not teach the specific surface area of the material after a 10 hour calcination at  $1000 \text{ C}$ , it teaches values which are clearly equivalent to our better than required by the instant claims. In fact, the reference teaches specific surface areas of over  $24 \text{ m}^2/\text{g}$  for 6 hour calcination at  $1100 \text{ C}$  which is considerably higher than that required by claims 24 and 25. It is therefore concluded, that the composition as taught by Aozasa would inherently possess the properties as required by claims 20-27.

In the alternative, as the reference teaches the same composition and substantially the same method of making, one would expect the material to have

specific surfaces areas similar to that claimed. The Patent and Trademark Office can require Applicant to prove that prior art products do not necessarily or inherently possess characteristics of claimed products where claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes; burden of proof is on Applicants where rejection based on inherency under 35 U.S.C. § 102 or on prima facie obviousness under 35 U.S.C. § 103, jointly or alternatively, and Patent and Trademark Office's inability to manufacture products or to obtain and compare prior art products evidences fairness of this rejection, *In re Best, Bolton, and Shaw*, 195 U.S.P.Q. 431 (CCPA 1977).

In regards to claim 28, Aozasa teaches additive components which do not exceed 50% by weight. See for instance, Examples 1-8, which each teach zirconium oxide to comprise at least 65% of the composition by weight (see Table 1).

In regards to claims 29-30, Aozasa teaches compositions comprising zirconium oxide and additives of cerium oxide and lanthanum oxide, teaches overlapping ranges of additive addition, and specific embodiments including additives in the amount of 34.2 and 25.1% by weight (see examples 1 and 2 respectively) which anticipate the required ranges.

In regards to claim 31, Aozasa is silent to the porosity of the composition, however since the reference teaches the same materials and method of forming the composite, one would expect the composite to have a pore size similar to

that claimed. Thus, it would follow that the material as taught by Aozasa would inherently or would necessarily possess the pore size as required by claim 31.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aozasa (US6171572).

In regards to claims 32, Aozasa teaches a composition comprising zirconium oxide at one or a mixture of additives selected from yttrium, scandium, lanthanum, praseodymium, neodymium, samarium, europium, gadolinium, magnesium, calcium, barium, aluminum, titanium, and hafnium (see col 3, ln 23-38). Thus, it would have been obvious to one of ordinary skill in the art to select a composition comprising zirconium, one or more of praseodymium, neodymium,

and lanthanum, and further comprising aluminum from the genus as taught by Aozasa.

In regards to claims 36-38, Aozasa teaches a composition as required by claim 20 (see rejection above) and teaches that such a composition is useful as a co-catalyst in catalyst systems further comprising metals such as platinum, palladium, or rhodium and methods of treating exhaust gases with said catalyst systems. It would have been obvious to one of ordinary skill in the art, in view of the teachings of Aozasa to form a catalyst system comprising the zirconium, cerium, lanthanum composite oxide further comprising a metal such as Pt, Pd, or Rh. The addition of metals such as Pt, Pd, and Rh to a zirconium composite oxide support is well known in the art (see for example (US20030224931)). It would have been further obvious to one of ordinary skill in the art to use such a catalyst system to treat exhaust gases, in order to enhance the properties of the catalytic metals, and to increase the industrial applicability of the invention.

6. Claims 33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aozasa (US6171572) in view of Yamamoto et al. (US2003/0224931).

Claim 33 is drawn to a method of making a zirconium oxide containing catalyst composition.

In regards to claims 33-35, Aozasa teaches a method of making a catalyst material comprising steps for forming a mixture of zirconium, lanthanum, and cerium nitrates, adding to the mixture deionized water and ammonia (a basic

compound), forming a precipitate, heating said precipitate at 500 C to form a gel, and further calcining said gel at 900, 1000, and 1100 C (see example 1 and comparative example 1). The inclusion of aluminum is optional as required by the instant claims. Aozasa fails however, to teach the addition of a surfactant or carboxylic acid compound during the preparation as required by claim 33.

Yamamoto et al. ("Yamamoto") teaches a method of making a zirconium-cerium oxide catalyst material optionally comprising alumina, silica, or titania, comprising steps of forming an aqueous mixture of cerium nitrate and zirconium oxynitrate, adding hydrogen peroxide and ammonia, forming a precipitate, adding cationic and anionic surfactants, and calcining the resultant mixture (see Embodiment 1). Yamamoto further teaches an embodiment in which a mixture of a liquid component and decomposed zirconium and cerium compounds are heated, a surfactant is added to form a homogeneous precursor, and followed by a calcination (see [0066]-[0068]).

It would have been obvious to one of ordinary skill in the art to modify the teachings of Aozasa to add a surfactant during the preparation of the zirconium oxide containing material. The use of surfactants in the preparation of catalyst or catalyst supports is well known in the art, in order to direct or enhance the structure of resulting product. In addition, Yamamoto teaches that the use of a suitable surfactant will improve the diffusion properties of the additive particles (see [0054]). Furthermore, it would have been obvious to one of ordinary skill in the art to modify the teachings of Aozasa in view of Yamamoto to perform the



addition of a surfactant material before or after a heating step in order to modify the effects of the surfactant on the structure of resulting material.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN A. HEVEY whose telephone number is (571)270-3594. The examiner can normally be reached on Monday - Friday 7:30 AM to 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on 571-272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jerry A Lorengo/  
Supervisory Patent Examiner, Art Unit 1793

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